

Annual Report 2008



Production Sector

Company Information

Company Name: SandRidge Energy
Gas STAR Contact: Stuart A. Wittenbach
Title: Director of Environmental Health & Safety
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City, State, Zip Code: Oklahoma City, OK 73102-6406
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Annual Report Summary

Total reductions = 8,160 Mcf

- ☐ BMP 1: Identify and replace high-bleed pneumatic devices
☐ BMP 2: Install flash tank separators on glycol dehydrators
☒ Partner Reported Opportunities (*please specify*):

Use of Plunger Lift Systems in Gas Wells

Install flares

Period covered by report: From: 01/01/08 To: 12/31/08

Partner Signature Required:

I hereby certify the accuracy of the data contained in this report.

Date

- Because the implementation of some technologies reduces emissions for multiple years, Gas STAR allows certain activities to count towards a company's emission reductions beyond the initial year of implementation. Gas STAR designates the maximum length of time that these reductions may accrue as "sunset dates." The Appendix lists these sunset dates. Companies can report the corresponding methane emission reductions each year up to the allowable sunset date. Or, companies may wish to report reductions only once for the implementation year, and have EPA automatically apply the sunset date and count those emissions for the allowable number of years.
- In addition to reporting methane emissions reductions, you are welcome to include other information about your company's participation in Natural Gas STAR in the "Additional Program Accomplishments" section of this form. The Natural Gas STAR Program will use any information entered in this section to recognize the efforts and accomplishments of outstanding partners.

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OMB Control No. 2060-0328
Expires 07/31/2011

BMP 1: Identify and Replace High-Bleed Pneumatic Devices

Current Year Activities

A. Facility/location identifier information: _____

B. Facility summary:

Number of devices replaced: _____ devices

Percent of system now equipped with
low/no-bleed units: _____ %

C. Cost summary:

Estimated cost per replacement
(including equipment and labor): \$ _____ /replacement

D. Methane emissions reduction: _____ Mcf

E. Are these emissions reductions a one-year reduction or a
multi-year reduction? ☐ One-year ☐ Multi-year

If Multi-year:

☐ Partner will report this activity once and let EPA
automatically calculate future emission reductions based on
sunset date duration (BMP 1 has a sunset period of 7 years).

☐ Partner will report this activity annually up to allowed
sunset date.

Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations

☐ Standard calculation

*Methane emissions reduction = [Annual emissions from high-bleed
devices being replaced (in Mcf/yr) - Annual emissions for the
replacement devices (in Mcf/yr)] x Number of devices replaced*

Please specify your data source:

- ☐ Field measurement
- ☐ Manufacturer specifications

☐ Calculation using default

Methane emissions reduction = 124 Mcf/yr x Number of devices replaced

☐ Other (please specify):

*For assistance quantifying the methane emission reductions achieved by
BMP 1, please refer to the Gas STAR Emission Reduction Quantification
Reference Guide, available on the Gas STAR Web site at:
epa.gov/gasstar/documents/xls/quantifying_ngo_methane_reductions.xls.*

F. Total value of gas saved: \$ _____

*Total value of gas saved = Methane emissions reduction (in Mcf) x
Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]*

G. How many high-bleed
devices do you plan to
replace next year? _____ devices

Previous Years' Activities

Use the table below to report any past activities implemented, but not previously reported to the Natural Gas STAR Program

Year	# Devices Replaced	Total Cost of Replacements (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

BMP 1 Comments: Please use the back of the page for additional space if needed.



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BMP 2: Install Flash Tank Separators on Glycol Dehydrators

Current Year Activities

A. Facility/location identifier information: _____

B. Facility summary:

Number of flash tank separators installed: _____ separators

Percent of dehydrators in system equipped with flash tank separators: _____ %

C. Cost summary:

Estimated cost per flash tank separator installation (including equipment and labor): \$ _____ /installation

D. Methane emissions reduction: _____ Mcf

E. Are these emissions reductions a one-year reduction or a multi-year reduction? ☐ One-year ☐ Multi-year

If Multi-year:

☐ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration (BMP 2 has a sunset period of 10 years).

☐ Partner will report this activity annually up to allowed sunset date.

Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations

☐ Standard calculation

Methane emissions reduction per flash tank installation = [TEG circulation rate (in gal/hr) x Methane entrainment rate (in scf/gal) x hours of operation (in hrs/yr) x 0.90] / 1,000*

**If methane entrainment rate is not known, use a default value of 3 scf/gal for energy exchange pumps or 1 scf/gal for electric pumps*

☐ Calculation using default

Methane emissions reduction = [Average gas throughput (in MMcf/yr) x 170 scf/MMcf x 0.90] / 1,000

☐ Other (please specify): _____

Please specify your data source:

- ☐ Field measurement
☐ Manufacturer specifications

For assistance quantifying the methane emission reductions achieved by BMP 2, please refer to the Gas STAR Emission Reduction Quantification Reference Guide, available on the Gas STAR Web site at: epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls

F. Total value of gas saved: \$ _____

Total value of gas saved= Methane emissions reduction (in Mcf) x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

G. How many flash tank separators do you plan to install next year? _____ flash tank separators

Previous Years' Activities

Use the table below to report any past activities implemented, but not previously reported to the Natural Gas STAR Program

Year	# Flash Tank Separators Installed	Total Cost of Installation (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

BMP 2 Comments: Please use the back of the page for additional space if needed.



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Partner Reported Opportunities (PROs)

(For more details on PROs, visit epa.gov/gasstar/tools/recommended.html)

Current Year Activities

A. Facility/location identifier information: Arkansas, Oklahoma, and Texas

B. Activity description: Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

Use of Plunger Lift Systems in Gas Wells

Please describe how your company implemented this activity:

SandRidge acquired a number of Plunger Lift Wells (PLW) not previously reported to the Natural Gas STAR Program. During 2008, SandRidge installed an additional 72 PLW in AK, OK, and TX.

C. Level of Implementation (check one):

- ☒ Number of units installed: 72 units
☐ Frequency of practice: _____ times/year

D. Are emissions reductions a one-year reduction or a multi-year reduction? ☐ One-year ☒ Multi-year

If Multi-year:

☒ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration*.

☐ Partner will report this activity annually up to allowed sunset date.

E. Methane emissions reduction: **2160*** Mcf

* Assumed 30,000 scf/yr as average of range given in referenced document.

F. Cost summary: Estimated cost of implementing this practice/activity (including equipment and labor): \$ na

Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations

☐ Actual field measurement

☒ Other (please specify): "Installing Plunger Lift in Gas Wells - Lessons Learned", June slide 15.

☐ Calculation using manufacturer specifications/other source

For assistance quantifying the methane emission reductions achieved by a particular technology or practice, please refer to the Gas STAR Emission Reduction Quantification Reference Guide, available on the Gas STAR Web site at: epa.gov/gasstar/documents/xls/quantifying_ngs_methane_reductions.xls.

G. Total value of gas saved: **\$ 15,120**

Total value of gas saved = Methane emissions reduction (in Mcf)
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

H. To what extent do you expect to implement this practice next year?

Installation of new PLWs will continue.

Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)
Pre 2008	168 PLW acquired and installed		5,040	35,280

PRO Comments: Please use the back of the page for additional space if needed.

Entered as 2007 activity.



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Partner Reported Opportunities (PROs) (For more details on PROs, visit epa.gov/gasstar/tools/recommended.html)

Current Year Activities

A. Facility/location identifier information: Louisiana

B. Activity description: Please provide a separate PRO reporting form for each activity reported. If reporting a DI&M activity, please use a separate page for each location/facility surveyed.

Please specify the technology or practice that was implemented (choose from the list in the appendix or describe your own):

Install Flares

Please describe how your company implemented this activity:

Three flares are operated at Louisiana facilities

C. Level of Implementation (check one):

- ☐ Number of units installed: _____ units
☒ Frequency of practice: = continuous

D. Are emissions reductions a one-year reduction or a multi-year reduction? ☐ One-year ☒ Multi-year

If Multi-year:

☒ Partner will report this activity once and let EPA automatically calculate future emission reductions based on sunset date duration*.

☐ Partner will report this activity annually up to allowed sunset date.

E. Methane emissions reduction: **6,000** Mcf

F. Cost summary: Estimated cost of implementing this practice/activity (including equipment and labor): \$ na

Please identify the basis for the emissions reduction estimate, using the space provided to show any calculations

- ☐ Actual field measurement ☒ Other (please specify): PRO Fact Sheet No. 905
☐ Calculation using manufacturer specifications/other source

For assistance quantifying the methane emission reductions achieved by a particular technology or practice, please refer to the Gas STAR Emission Reduction Quantification Reference Guide, available on the Gas STAR Web site at: epa.gov/gasstar/documents/xls/quantifying_methane_reductions.xls.

G. Total value of gas saved: \$

Total value of gas saved = Methane emissions reduction (in Mcf)
x Gas value (in \$/Mcf) [If not known, use default of \$7.00/Mcf]

H. To what extent do you expect to implement this practice next year?

Practice will continue

Previous Years' Activities

Use the table below to report any past implementation of this PRO, but not previously reported to Natural Gas STAR

Year	Frequency of Practice/Activity or # of Installations	Total Cost of Practice/Activity (incl. equipment and labor) (\$)	Estimated Reductions (Mcf/yr)	Value of Gas Saved (\$)

PRO Comments: Please use the back of the page for additional space if needed.



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Additional Program Accomplishments

The Natural Gas STAR Program will use any information entered here to recognize the efforts and achievements of outstanding partners.

Please include any additional information you would like to share about your company's participation in Natural Gas STAR. Examples may include:

- Activities to strengthen your program (e.g., training/education, innovative technologies or activities, pilot projects, employee incentive programs).
- Efforts to communicate your participation and successes (e.g., internal newsletters, press releases, company Web site).
- Participation in Natural Gas STAR program activities (e.g., contributions to case studies, presentation at annual workshop).

Additional Accomplishments:

Additional Accomplishments Comments: *Please use the back of the page for additional space if needed.*



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Appendix

Methane Emission Reduction Technologies & Practices— Production Sector

The list below describes a variety of methane emission reduction technologies that Natural Gas STAR partners in the production sector have implemented and reported to Natural Gas STAR. You may use this list as a guide when completing your annual report. Sunset dates (i.e., the length of time a technology or practice can continue to accrue emission reductions after implemented) are one year in duration unless otherwise noted in parentheses. An asterisk (*) indicates that a technical document related to the technology or practice is available online at epa.gov/gasstar/tools/recommended.html.

Compressors/Engines

- Automate systems operation to reduce venting*
- Automated air/fuel ratio controls (10 years)*
- Catalytic converter installation (10 years)
- Convert engine starting to nitrogen (10 years)*
- Convert to low pressure compressor starters (10 years)
- Eliminate unnecessary equipment and/or systems*
- Increase compression capacity to reduce venting/flaring
- Install electric compressors (10 years)*
- Install electric motors (10 years)
- Install lean burn compressor (10 years)
- Redesign blowdown systems and alter ESD practices*
- Reducing emissions when taking compressors off-line*
- Reducing methane emissions from compressor rod packing systems*
- Replace gas starters with air (10 years)*
- Replace ignition - reduce false starts*
- Turbine fuel use optimization

Dehydrators

- Install condensers on glycol dehydrators (10 years)
- Optimize glycol circulation and install of flash tank separators in dehydrators*
- Replacing gas-assisted glycol pumps with electric pumps (10 years)*
- Replacing glycol dehydrators with desiccant dehydrators (10 years)*
- Reroute glycol skimmer gas*
- Shutdown glycol dehydrator stripping gas in winter

Directed Inspection and Maintenance

- DI&M at compressor stations*
- DI&M: leak detection using lower emission threshold
- DI&M: survey and repair leaks

Pipelines

- Inject blowdown gas into low pressure mains*
- Pipeline replacement and repair
- Using pipeline pumpdown techniques to lower gas line pressure before maintenance *

Pneumatics/Controls

- Capture/use gas released from gas-operated pneumatic pumps
- Convert gas pneumatic controls to instrument air (10 years)*
- Convert gas-driven chemical pumps to instrument air (10 years)*
- Convert pneumatics to mechanical controls (10 years)*
- Install controllers on gas-assisted methanol pump (10 years)
- Install electronic flare ignition devices (10 years)*
- Install no bleed controllers (10 years)
- Install non-venting dump controllers (10 years)
- Reduce gas pressure on pneumatic devices
- Use add-on controls to reduce emissions from pneumatics (10 years)

Tanks

- Consolidate crude oil production and water storage tanks (10 years)*
- Convert water tank blanket from natural gas to produced CO₂ gas (10 years)*
- Install evactors (10 years)
- Install flash gas compressors (10 years)
- Install hydrocarbon liquid stabilizer (10 years)
- Install pressurized storage of condensate (10 years)*
- Installing VRUs on crude oil storage tanks (10 years)*
- Protective tank coatings to reduce leaks (10 years)
- Recycle line recovers gas during condensate loading*
- Reduce excess blanket gas blow-by to the atmosphere

Appendix (cont.)

Valves

- Install BASO valves (10 years)*
- Install plugs on valves and open ended lines (10 years)
- Test and repair pressure safety valves

Wells

- Artificial lift: gas lift (10 years)
- Artificial lift: pressure swabbing
- Connect casing to vapor recovery unit *OR* Install compressors to capture casinghead gas (10 years)*
- Gas well "smart" automation system (10 years)*
- Gas well unloading time optimization*
- Perform reduced emissions completions/green completions*
- Install automated shut-in cycle units to reduce well venting (10 years)
- Install flash tank separator on water gathering system (10 years)
- Install pumpjacks on low water production gas wells (10 years)*

- Install pumps for separators (10 years)
- Install soap launcher/soap unit (10 years)
- Install velocity tubing strings (10 years)*
- Installing plunger lift systems at gas wells (10 years)*
- Lower heater-treater temperature*
- Use foaming agents*

Other

- Capture and use waste heat to reduce gas usage and emissions
- Convert natural gas fired generator to solar power (10 years)
- Flare reduction program
- Install flares (10 years)*
- Nitrogen rejection unit optimization*
- Recover gas from separators
- Re-inject gas for enhanced oil recovery
- Re-inject gas into crude
- Replace aged heaters with new efficient gas fired heaters (10 years)

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